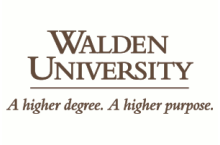

2020

A Staff Educational Model for Prevention of Type 2 Diabetes in the Primary Care Setting

Mieshia Staples Clark
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral study by

Mieshia Clark

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Dana Leach, Committee Chairperson, Nursing Faculty
Dr. Allison Terry, Committee Member, Nursing Faculty
Dr. Barbara Gross, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2020

Abstract

Staff Educational Model for Prevention of Type 2 Diabetes in the Primary Care Setting

by

Mieshia S. Clark

MSN, FNP-C, Walden University, 2015

ASN, Georgia Perimeter College, 2010

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2020

Abstract

Type 2 diabetes is a chronic, debilitating disease affecting millions of Americans. Though preventable, it is the most common form of diabetes in the United States, costing the U.S. health care system billions of dollars annually. Lifestyle modifications taught, encouraged, and supported in established, evidence-based diabetes prevention programs (DPP) are proven to be more effective than medications alone in preventing Type 2 diabetes. While DPPs are cost-effective and can reduce or delay the incidence of Type 2 diabetes, they are greatly underutilized due to primary care providers'lack of knowledge about the benefits and availability of these programs and also due to their attitudes and opinions towards DPPs . Without intervention, the incidence of Type 2 diabetes is expected to more than double in the U.S. DPPs improve quality of life, save millions of lives annually, and decrease health care spending significantly. This study is designed to increase knowledge and awareness of primary care clinicians related to the use of DPPs to manage prediabetes. Goals of the study are to decrease the incidence of Type 2 diabetes and improve patient outcomes through increasing referrals to DPPs or to encourage the development of more DPPs. A staff educational model will be utilized to educate primary care providers on the benefits of DPPs, followed by a post questionnaire to assess knowledge and attitudes as it relates to DPPs. The Diffusion of Innovation Theory is the theoretical framework used to guide this study.

Staff Educational Model for Prevention of Type 2 Diabetes in the Primary Care Setting

by

Mieshia S. Clark

MSN, FNP-C, Walden University, 2015

ASN, Georgia Perimeter College, 2010

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2020

Dedication

This project is dedicated to my children and grandchildren. By God's grace and mercy, you guys have been my motivation in every step of my journey as a nurse. I pray that this work encourages you all to be the best you can possibly be in life and to always live with excellence as a goal.

Acknowledgments

I would like to thank my lord and creator, all mighty God who in his infinite wisdom and mercy gave me life, success, and the best way of life: Islam. With him and only him are all things possible.

I would like to extend sincere thanks to my mother for caring for me when I was unable to care for myself, and for encouraging me in all aspects of life. It is your example that has guided me and cultivated me to become the woman I am today.

To my spouse, Charles Clark, Jr., thank you for encouraging me to return to school to obtain a doctoral degree and for reminding me of my capabilities and strengths.

Finally, heartfelt gratitude to my preceptor, Dr. R.Vadovic and my project chair Dr. D. Leah for your patience and guidance, which afforded me opportunities to learn and grow as an advanced practice nurse.

Table of Contents

Section 1: Nature of the Project

Introduction

Prediabetes affects 86 million Americans, about one in three persons. Approximately 25% of prediabetic individuals will develop Type 2 diabetes within 5 years without intervention. Type 2 diabetes, which represents 90-95% of the diagnosed cases of diabetes in the United States, is a national and global epidemic, responsible for over $327 billion in health care costs in 2017 in the United States, up 26% from previous years (Centers for Disease Control and Prevention [CDC], 2017). Type 2 diabetes is a chronic, debilitating disease responsible for decreased quality of life, premature death, decreased productivity, impaired vision and blindness, limb amputations, renal failure, cardiovascular disease, poor health outcomes, and it is estimated that persons who suffer from the disease will die ten years earlier than those without the disease. (CDC, 2017). Incidence of Type 2 diabetes is projected to increase from 1 in every 10 individuals to 1 in every 3, as Americans have become more sedentary and obese, eating a nutrient-devoid, calorie-dense diet. Prediabetes care increased over 70% to $44 billion from $33 billion between 2007 and 2012 (American Diabetes Association [ADA], 2019). With such staggering statistics and projected future burden of the disease, the U.S. health care system will not be able to afford the cost of management of the disease; as such, reducing incidence of the disease is imperative (Powers et al., 2016). Promoting and supporting strategies to prevent or decrease the incidence of Type 2 diabetes should be a priority for health care systems. Research has shown that preventive care models are less costly than managed care models, promote health and wellbeing, and improve population outcomes.

Diabetes prevention programs (DPPs) are viable, evidence-based, effective solutions, designed to decrease the incidence of Type 2 diabetes.

This project is designed to increase awareness among health care clinicians, which includes nurses, in the largest health care facility in the state of Nevada of the benefits of CDC Prevent T2 programs with the goal of increasing referrals to such programs or encouraging the development of Prevent T2 programs within the facility to help decrease the incidence and burden of Type 2 diabetes in the patient population in the state. Primary care clinicians treat more than 90% of patients who have diabetes, so targeting them and their staff will benefit a large population of patients (American Academy of Family Physicians [AAFP], 2019). Statistical data from 2018 for the state of Nevada shows that over 25% of the state is physically inactive, over 25% are obese (both risk factors for prediabetes and then diabetes), and over 10% has been diagnosed with diabetes (United Health Foundation, 2019). In addition, over 35% of the population has prediabetes, costing the state over $2 billion annually (ADA, 2015).

Problem Statement

Type 2 diabetes is a preventable, chronic, debilitating disease responsible for astronomical health care costs and utilization, decreased quality of life, and poor health outcomes. Prediabetes, the precursor to Type 2 diabetes, affects 86 million Americans, and it is estimated that 25% of those with prediabetes will develop Type 2 diabetes without intervention within 5 years of diagnosis (ADA, 2015). Prediabetes, like Type 2 diabetes, increases a person’s risk for stroke, cardiovascular disease, microvascular and microvascular disease. CDC Prevent Type 2 are evidence-based DPPs that have proven

to decrease the incidence of Type 2 diabetes by 58-71% in persons age 45 and older (CDC, 2017). Although these programs have proven to be effective, viable, affordable solutions to prevent the incidence of Type 2 diabetes, they are underutilized. Research suggests that they are underutilized because health care providers, which includes nurses, do not refer patients to DPPs (Kandula, et al., 2018). Reasons for clinician lack of referrals to DPPs include attitudes towards DPPs lack of knowledge of benefits and availability of DPPs, lack of knowledge of how to refer to DPPs, and lack of knowledge of health insurance coverage for DPPs.

In primary care, nurses and primary care providers are the first line defense in disease prevention and management. Nurses are trained to teach disease prevention and management interventions. Because DPPs are fairly new programs, many nurses and primary care providers are unaware of their availability or are unaware of their benefits. In addition, because many primary care facilities do not offer DPPs within their facilities, are unaware of the resources available to start and maintain such programs, and do not provide training to employees regarding the benefits and availability of such programs, many patients never receive referrals to DPPs. Less than 10% of patients diagnosed with prediabetes are referred to DPPs (AADE, 2016). Educating nurses and primary care providers on the benefits of these programs will help to shed light on the benefits of DPPs, help to improve referrals to DPPs, help to increase the availability of DPPs, and ultimately decrease incidence of Type 2 diabetes and improve patient outcomes.

Diabetes and prediabetes care cost the state of Nevada over 2 billion dollars annually. Over 12% of the adult population suffers from diabetes, with almost 40% of the

population diagnosed with prediabetes, and each year over 10,000 persons are diagnosed with diabetes (ADA, 2015). I am employed at one of the largest health care facilities in Nevada. The facility has more than 300 primary care facilities, serving more than 300,000 patients annually. The vast majority of patients are diagnosed with prediabetes and Type 2 diabetes in primary care. Aiming this project at nurses and other health care providers in primary care will help to shed light on the significance of treatment and management of prediabetes early, thus decreasing the incidence of Type 2 diabetes. Providing education on the guidelines, benefits, and significance of diabetes prevention and lifestyle interventions/modifications in the management of prediabetes will again help to reduce the burden of Type 2 diabetes in Nevada.

Purpose Statement

This project aims to increase awareness in nurses and primary care providers of DPPs with the hopes of increasing referrals and increasing development of more such programs within the organization, to ultimately improve patient outcomes by way of a staff educational model. The staff educational model is designed to address the practice-focused question: Will the implementation of an evidence-based diabetes prevention staff educational program help to improve health care provider's attitudes and knowledge of DPPs in the primary care setting and ultimately improve referrals to DPPs? The goal of the staff educational model is to shed light on the benefits, availability, and ease of development of new DPPs. Increasing referrals to or development of DPPs will help lower the incidence of Type 2 diabetes in the area, thus decreasing health care costs,

improving quality of life for the population, and improving outcomes for those who suffer from prediabetes.

As mentioned above, the health care facility where I am employed provides care to over 300,000 Medicare Advantage patients in the state of Nevada. It is the leading health care provider in the state. Of the over 12,000 persons served at the project site who have been diagnosed with diabetes, over 90% have Type 2 diabetes. A large number of the 300,000 lives served are obese, lead sedentary lifestyles (both precursors to the development of Type 2 diabetes), and have been diagnosed with prediabetes. Because the organization serves a large Medicare population, outcomes are an important part of cost savings. Preventive care helps lower cost for all health care facilities, as it prevents the development of chronic disease. Chronic disease is costly and lowers quality of life. Although the health care facility serves a large population in Nevada, especially the Las Vegas area, caring for over 12, 000 patients who have diabetes and a large population of those with the diagnosis of prediabetes, it does not have a DPP, and like most of the country use of such programs is low. Within the organization, there is no way to refer patients to DPPs, many primary care clinicians are unaware of the availability of these programs, are unaware of the benefits of the programs, and are unaware that DPPs are a covered Medicare service. In addition, there are only 10 DPPs in the state of Nevada and only two in Las Vegas, an area with over 750,000 persons diagnosed with prediabetes.

Nature of the Doctoral Project

Sources of evidence for this project were obtained from reputable sources such as the American Association of Diabetes Educators (AADE), the ADA, the American

Medical Association (AMA), the American Journal of Public Health, the National Diabetes Prevention Program, the CDC, the National Institutes of Health, and the Diabetes Prevention Research Group. I reviewed peer-reviewed randomized control trials, systematic reviews, qualitative studies, and mixed methods studies and used them as evidence. Articles were reviewed and chosen from multiple databases such as CINAHL, Ovid Plus, Nursing Journals, PubMed, and numerous university and professional organizational sites. Keywords used to find appropriate articles and data include: *prediabetes, diabetes prevention programs, referrals to diabetes pr*evention *programs, type 2 diabetes, diabetes education, diabetes prevention, lifestyle modifications for diabetes, nurses and diabetes, nurses and diabetes prevention, nurses and diabetes education, nurses and prediabetes, primary care and prediabetes, primary care and diabetes prevention,* and *management of prediabetes.* Articles were selected based on timing (none older than 10 years), relevance to the topic, strength of the source and data, preference was given to peer reviewed articles.

The AADE (2016) stated that if the health care arena wishes to reduce cost and change the course of diabetes in this country, it must prevent the conversion of prediabetes to Type 2 diabetes. The organization also stated that preventing Type 2 diabetes will benefit the population from a fiscal perspective and from a population health perspective (Troupe, 2017). The National Diabetes Prevention Program (the largest diabetes prevention research organization) and the CDC have recognized that lifestyle interventions reduce the incidence of diabetes by 58% among individuals diagnosed with prediabetes aged 45 to 59 and by over 70% in those aged 60 and older.

Both organizations also report that lifestyle interventions help to mitigate the health and economic issues associated with prediabetes (Khan, Tsipas, & Wozniak, 2017). Research has shown that 10 years after attending and completing a CDC-recognized DPP, participants were one-third less likely to develop Type 2 diabetes than were individuals who did not attend a DPP (CDC, 2018). According to the ADA, persons who have been diagnosed with prediabetes should be referred to intensive behavioral lifestyle intervention programs modeled on DPP guides, to achieve weight loss and lifestyle modifications needed to prevent Type 2 diabetes (Ray, Thielke, & King, 2017). The Diabetes Prevention Research Group found that lifestyle interventions (performed under the guidance of a Prevent T2 lifestyle coach) prevented the diagnosis of Type 2 diabetes in one in every seven persons treated for 3 years (Castro, Shibi, & Boehm-Smith, 2009).

There is increasing awareness about the importance of self-care in the management of chronic disease. How and what patients do on a daily basis to manage disease has a major influence on their outcomes. Most individuals require support to obtain the knowledge, skill, and confidence to cope with managing chronic disease. DPPs provide just that: support, knowledge, skill, and self-confidence to prevent diabetes. There is a growing body of evidence that engagement of health care professionals is critical for the use, development, and establishment of DPPs. Lack of integration of such programs in primary care has resulted in the lack of referrals to DPPs, which decreases follow-up and reinforcement by primary care providers of management interventions for the disease; as such, referrals from primary care providers have been identified as an important factor to enhance patient participation in DPPs, and it has been established that

participation and engagement of primary care clinicians, which includes nurses, is critical for successful application of interventions and skills taught in DPPs (Sunaert et al., 2011).

As mentioned earlier, referrals to DPPs are low; less than 10% of patients diagnosed with prediabetes are referred. Understanding why has been the focus of many studies. Such studies have identified reasons such as personal attitudes (by clinicians and patients) towards DPPs, lack of knowledge of benefits of DPPs, lack of knowledge about availability of DPPs, concerns about the appropriateness for DPPs for certain patient populations, ambivalence about encouraging certain patients into self-management, preference to manage the disease on their own, fear and frustration about primary care providers role in prediabetes management, and resistance to innovation (Sunaert et al., 2011). In addition, some providers feel threatened by DPPs, as they are unsure if these programs will replace them in management of their patients who have prediabetes, and lastly, some are unaware of how to refer to DPPs (Sunaert et al., 2011).

In a research project performed by the AMA designed to increase awareness of primary care providers about DPPs, it was found that referrals went from zero to five thousand, that over 55% of clinical staff were aware of DPPs and resources within their community on a pre-survey, but over 80% were aware post-intervention. In addition, there was a 5% increase in referrals to DPPs compared to control groups referrals of 0.7% (Keck, Rober, Thomas, & Hieronymus, 2019). Additional research found that primary care clinicians viewed prediabetes care as important and positively, were aware of prediabetes management clinical guidelines, but had low awareness of DPPs, thus patients were not referred to DPPs (Kandula, Moran, Tang, & O'Brien, 2018). Research

has also suggested that primary care providers prefer intensive lifestyle interventions for management of prediabetes over other methods of treatment, yet referrals to DPPs were not done (Keck, 2019).

For this project, I used the suggested clinical guidelines and evidence-based recommendations for management of prediabetes set forth by the ADA, the United States Preventive Services Task Force (USPSTF), the American Association of Clinical Endocrinologists, the AADE, the National Diabetes Research Group, and the CDC to create the staff educational model. The educational model was given to nine clinicians who provide care to patients with prediabetes regularly. Thirty days following the administration of the staff educational model, I administered a post-questionnaire to assess staff attitudes, opinions, knowledge, and use of diabetes prevention and DPPs. Data from the questionnaires were then interpreted through descriptive analysis.

As mentioned previously, Type 2 diabetes is a chronic, debilitating, preventable disease responsible for poor quality of life, increased mortality and morbidity, and astronomical health care costs nationally and worldwide. Providing patient education on the seriousness of the disease, and their ability to prevent this disease through lifestyle modifications is the responsibility of health care providers. Sustainable, effective education that promotes lifestyle modifications are taught in DPPs. Nurses will be great resources and facilitators for developing and referring to DPPs, as they are first line educators for disease management and prevention in health care. There is clearly a gap in prediabetes care as it relates to nursing, which includes advanced practice nurses, in knowledge regarding prediabetes care and diabetes preventive services as only 711

counties of the 3,142 counties in the United States have DPPs, only 10 programs exist in Nevada, a state where over 35% of the population has been diagnosed with prediabetes, and less than 10% of the U.S. population is referred to these services (ADA, 2014). In addition, lack of knowledge of the availability and benefits of DPPs has been identified as a major barrier to use of DPPs.

In a formative research project conducted on health care providers who care for patients diagnosed with diabetes and prediabetes, designed to gain clear understanding of barriers to DPP referrals among clinicians and patients, it was noted that the largest barrier to referrals to DPPs was a lack of knowledge (Johnson & Melton, 2016). Participants in the survey included primary care providers, endocrinologists, registered nurses, dieticians, psychologists, and advanced practice providers, all of whom had been practicing for 5 years or more providing care to patients with diabetes and prediabetes (Johnson & Melton, 2016). Johnson and Melton (2016) surveyed 251 health care providers and concluded that only about 50% of clinicians referred patients to DPPs, 29% were unaware of what DPPs taught and where they were held, and those who heard of DPPs were not sure of their benefits. The biggest barrier to referrals as mentioned above was general lack of knowledge about the programs (Johnson & Melton, 2016).

Researchers from the CDC's National Center for Chronic Disease Prevention and Health Promotion Department found that referrals to DPPs nationally are remarkably low despite extensive evidence from evidence-based research indicating the success of DPPs (Keck, 2019). Major gaps were noted in patients receiving advice about prediabetes management and in engaging patients in risk reduction activities and programs. It was

also noted that health care professionals commonly failed to refer patients most at risk for the development of Type 2 diabetes to DPPs. The researchers stated reasons for low referrals as follows: health care professionals were more likely to give general advice about risk reduction (60% of those surveyed), than to refer patients to weight loss programs (20% of those surveyed), or to DPPss (5%) of those surveyed), health care professionals may not believe in the effectiveness and benefits of DPPs, are less aware of these programs, and because they believe accessibility to such programs is not good. The researchers analyzed data from a 2016 and 2017 National Health Interview Survey (the largest nationally representative cross-sectional survey) and found that more than 50,000 respondents reported being overweight or obese and diagnosed with prediabetes. Of those diagnosed with prediabetes, about 70% received any guidance in the past year from their health care professional regarding prediabetes management, less than 60% received advice to increase physical activity or decrease caloric intake, about 20% participated in a weight loss program, and less than 5% reported receiving referrals to DPPs. The researchers suggested that the key to improve referrals and accessibility to DPPs is to increase awareness in health care providers and insurance providers (Minerd, 2019).

It is important to remember the impact nurses play in disease prevention and health promotion. Nurses exert a great influence on patient outcomes as they are quite often the health care providers that are in contact with patients the most and whom patients turn to most often for health advice. Nurses also help to encourage and influence provider decision-making as it relates to daily care of patients. In a research trial designed to show the effectiveness of nurses on provider preventive measures as it relates to

prediabetes care, it was noted that nurses have a great impact on the screening process and referral process (Boltri, Smith, Roman, & Tobin, 2007) . In this trial, nurses were trained to screen patients for prediabetes, when patients were found to meet the criteria nurses then initiated a prompt in the facility's EHR which was sent to the primary care provider who in turn completed a referral for diabetes preventive services. There were 597 participants in the study, performed at 10 primary care practices, and it was found that the intervention group was more likely to receive preventive measures (95% confidence) and it was concluded that a nurse prompt is an effective tool to increase screening and preventive services for those at risk for type 2 diabetes development (Boltri, Smith, Roman, & Tobin, 2007). Nurses are also needed in the diabetes preventive process. As Shurbrook, Chen, and Lim (2018) stated, primary care providers are overwhelmed with patient load and care so they often do not have time to focus on preventive counseling and care as it relates to prediabetes.

Significance

The significance of this DNP project is to raise awareness in clinicians in the primary care setting of the benefits of DPPs in the hopes of increasing referrals to such programs or to encourage the development of more DPPs to help improve the health and outcomes of adult patients diagnosed with prediabetes. Empowering nurses and other clinical providers with the knowledge of DPPs will contribute to lowering health care costs by decreasing the incidence of Type 2 diabetes in the state and nationally. In addition, it will help to improve outcomes for adults aged 45 and older, those most at risk for developing Type 2 diabetes. Primary care clinician referrals are viewed as the most

powerful encouragement for patient behavioral change (Johnson & Melton, 2016). It will also provide patients with the knowledge they need to utilize and maintain self-care interventions, the key and basis for diabetes prevention and management. This objective also aligns with the Health People 2020 goal of reducing the disease burden of diabetes and improving the quality of life for all persons who have or are at risk for developing diabetes (HealthyPeople2020, 2014). Nurses have a duty to continually learn to ensure they are providing the most current, up-to-date, evidenced-based care to the populations they serve. Arming nurses with knowledge of the benefits of DPPs and the lifestyle interventions taught within the programs will help encourage organizational change as they can and will share and diffuse such knowledge throughout the organization and some may be motivated to initiate such programs within their places of employment or within their communities. In addition, the knowledge learned from the staff educational model can then disseminate throughout the nursing profession, as the nursing profession is a society built on knowledge, trust, and sharing. Sharing of this knowledge will help encourage development of more DPPs within communities, which will help as mentioned earlier improve outcomes for patients, and it will help promote consistency of care in prediabetes management. Continually learning and sharing of knowledge aligns with the tenets of the nursing code of ethics, which also includes commitment to patients, patient advocacy, responsibility and accountability to provide optimal nursing care, continual personal growth, advancement of the profession, and collaboration with other health care professionals (Rowland, 2012).

Implications for Social Change

Diabetes is the seventh leading cause of death in America. Older persons who are diagnosed with diabetes are two to four times more likely to die from heart disease or stroke than those who do not have the disease (Palmer, 2009). Persons' diagnosed with diabetes lifespan is cut short by at least 10 years. Type 2 diabetes is preventable; at least nine out of ten cases can be avoided through lifestyle modifications (Chan, 2019). DPPs decrease the rate of diagnosis of Type 2 diabetes by 58-71%, thus improving the quality of life for the population. Self-care strategies learned in DPPs help to mitigate the health and financial burdens associated with diabetes, as fewer patients are likely to suffer from heart disease, ophthalmic disease, renal failure, and vascular disease (Ray et al., 2017).

Research has proven that lifestyle modifications prevent Type 2 diabetes. Research has also shown that DPPs are viable, cost-effective solutions to prevent or delay Type 2 diabetes; as such, nurses and other health care providers have an obligation to encourage use of these preventable measures to decrease the incidence of this debilitating disease. Preventive measures include referrals to or development of more DPPs. Prevention of Type 2 diabetes is such an important social issue that it is a focus of the Healthy People 2020 initiative, the AMA, and the CDC (Khan et al., 2017). Both AMA and the CDC recommend early screening for prediabetes and early referral to CDC-recognized DPPs for those diagnosed with prediabetes to prevent the incidence of Type 2 diabetes. Lastly, research has shown that lifestyle modifications are more cost effective in the treatment of prediabetes than medications alone, which includes the use of Metformin (Khan et al., 2017). Educating nurses and other health care providers on the importance

and benefits of diabetes preventive services will encourage use and development of DPPs and thus improve the health and outcomes of the population.

Summary

Type 2 diabetes is a preventable, debilitating, chronic disease. Lifestyle modifications prevent the incidence of Type 2 diabetes. DPPs are evidence-based interventions designed and proven to prevent or delay the incidence of Type 2 diabetes, yet they are underutilized. Research has shown that DPPs are underutilized because of the opinions, attitudes, and lack of knowledge of health care clinicians about the benefits and availability of DPPs. Educating nurses and clinicians in primary care is an important place to begin in educating providers and encouraging use of DPPs as they are usually where the initial diagnosis of prediabetes is made and they are the area in healthcare that has the most contact with patients. Nurses are first-line educators, so informing them of this beneficial service will help encourage use of DPPs and will help disseminate knowledge of the benefits and availability throughout this organization and other such health care sites, it may also encourage development of more DPPs within communities.

Section 2: Background and Context

Introduction

Diabetes is a chronic disease affecting more than 10% of Americans. It is responsible for increased mortality, morbidity, and lost productivity, and is a public health crisis. The economic burden of prediabetes is equally troubling, as it sheds light on the potential future burden of diabetes and stresses the need for immediate diabetes preventive efforts. Prediabetes is most common in the adult population, diagnosed mostly in those aged 45 and older. It affects more than 10 million older adults aged 60 and older. Prediabetes increases a person's risk for cardiovascular disease, renal disease, hypertension, and stroke. Within three to five years it is estimated that 15 to 30% of those diagnosed with prediabetes will develop Type 2 diabetes without intervention (CDC, 2017).

Lifestyle modifications taught in DPPs have proven to reduce the incidence of Type 2 diabetes by 58-71%, delay the onset of Type 2 diabetes by 10 years, improve cardiovascular disease risk factors, and reduce health care costs by over $500 billion. The ADA and the Community Preventive Task Force have recommended the use of lifestyle interventions, such as weight loss and increased physical activity in health care systems and communities to prevent Type 2 diabetes (CDC, 2017). With an aging, sedentary, chronically ill, overweight population, all contributing factors to the development of Type 2 diabetes, interventions to decrease or prevent the incidence of Type 2 diabetes are vital to keep the burden of the disease from becoming worse.

CDC-recognized DPPs have proven to be one of the most effective methods to prevent Type 2 diabetes, yet only 70 programs exist across 22 states, with only 10 in the state of Nevada and only one in the city where this project takes place, a city with an estimated 787,000 (35%) of people diagnosed with prediabetes. This project is designed to address the inadequate use of DPPs, a crucial intervention for a crucial health issue. Targeting nurses and other health care providers in the primary care setting (increasing awareness of the benefits of DPPs) is an essential area in which to begin educating and encouraging health care clinicians, as these are the providers who are most in contact with persons diagnosed with prediabetes, provide the most education to patients, and do most of referral services for preventive care and disease management. Primary care clinicians treat 90% of patients who have diabetes or are at risk for the development of diabetes, so targeting them and their staff will benefit a large patient population (AAFP, 2019).

Concepts, Models, and Theories

Program success hinges on acceptance and dissemination of a program throughout an organization. Failure of evidence-based program innovations to be accepted and diffused in health care results in continued or increased rates of chronic disease, decreased quality of life for patients and their families, and poor outcomes. Diffusion is a natural social phenomenon that occurs as people accept and spread an idea or innovation. Diffusion of an intervention increases the number of people exposed to an intervention, thus improving the impact the intervention has on public health (Glanz, Rimer, & Lewis, 2002).

The diffusion of innovations theory is the theory used to guide this project. According to Dearing (2010), this theory focuses on the way in which ideas and social practices are spread through members of a social system. Diffusion of an innovation occurs on the individual, community, and organizational level. For successful adoption and implementation of any innovation, there must be a clear, well-defined need for change, a clear understanding of how the innovation will work, and it must be clearly understood and communicated why the innovation should replace the old way of doing things (Dearing, 2010). Successful diffusion occurs by way of three distinct processes: presentation of the innovation, acceptance of the innovation, and lastly integration of the innovation. The theory holds that there are varying levels of adoption of an innovation: some will adopt the innovation very early (early innovators; accounts for < 3% of population), others will adopt a little later (early adaptors, < 14%), a great majority will deliberate and interact with their peers before accepting the innovation (early majority; approximately 35%), while others will adopt the innovation as a result of peer pressure (late majority; approximately 35%), and approximately 15% will remain skeptics and hold out on adoption (laggards) (Dearing, 2010). In order for anyone to accept an innovation, it must contain attributes of relative advantage (cost efficient and effective), it must be simple, must have be compatible with the present system, it must have observability (outcomes can be observed), it must have trialability, be communicable, pervasive, profitable, and more efficient than alternatives (Dearing, 2010).

My hope is that, through exposing key health care providers to the DPP staff educational model, its benefits, and its use, the concept will be accepted, then

disseminated and diffused throughout the organization. Key stakeholders include medical directors of primary care and endocrinology, primary care providers, and nurse case managers assigned to manage care of high- risk patients who have been diagnosed with prediabetes. It is important to communicate the innovation to a special small subset of potential adopters who in turn are able to influence the vast majority to consider, adopt, and implement the innovation (Dearing, 2010). Nurses are highly respected and trusted front-line caregivers whose input, knowledge, and opinions foster meaningful change within organizations, so exposing them to the innovation will help increase acceptance and diffusion.

Relevance to Nursing Practice

Primary care is a setting for screening patients at high risk for chronic disease and for disease prevention and management. Primary care practitioners, who include a large percentage of nurse practitioners and other advanced degreed nurses, diagnose, treat, and manage illness. Nurse practitioners and nurses play a key role in disease prevention, management, and treatment of disease, mainly through education. Nurses are often overlooked yet are ideal professionals who successfully encourage lifestyle change and assist patients in disease prevention and management. They are cost-effective, experts in counseling, health education, and case management (Whittemore, Meelkus, Wagner, & Dziura, 2009). Patients look to nurses more than any other health care professional for advice on disease management and prevention, and proof of such is that nursing was ranked as the most trusted profession in a 2017 Gallup poll (AHA, 2018). The AADE encourages nurses to research evidence-based programs for diabetes management and

prevention and serve as advocates to get them implemented within organizations and communities (Hagstrom, 2016).

Preventive services are a component of health promotion. According to the CDC (2017), preventive health care interventions keep the population healthy, as disease-free as possible, reduce health care costs and burden, and keep the population active and productive. The CDC has also stated that preventive health care keeps seniors healthy during a period when chronic illness increases. Nurses, as mentioned above, are front-line health care professionals who have a significant impact on patient health through health education, disease prevention, facilitating access to care, and educating the community. Nurses council patients on risk factors such as obesity, sedentary lifestyle, smoking cessation, and medications, and they are a critical component in identifying available resources within communities. As such, educating nurses on DPP lifestyle interventions, benefits, and availability will help to increase patient access and provider acceptance to this vital preventive service. Nurses can partner with local organizations such as community health centers, faith-based groups, and schools to develop and expand access to DPPs and services.

More than half of Americans suffer from a chronic condition (Holiday, Williams, Salcedo, & Kandula, 2019). Chronic conditions will continue to plague the population without intervention. Treatment of chronic disease includes disease management, but it must include preventive care as a vital first-line component of care. Given that nurses are principle educators of patients and their families in disease management and prevention, arming nurses with the tools needed to help patients with preventive care, which includes

self-care practices, is critical for an aging, sedentary society who is at risk for the development of numerous chronic diseases, one of which is diabetes. Nurses have a duty to remain current on recent evidence-based practices to ensure patients receive the most up-to-date services available. Nurses have the ability to affect the entire population. They are advocates for the population, are a valuable resource in the patient care arena, and can encourage use and development of new and existing health care services.

Local Background and Context

Prediabetes is a serious health condition where blood glucose is elevated, not high enough to be considered Type 2 diabetes, but elevated enough to cause insulin resistance leading to a host of other health issues which includes: hyperlipidemia, chronic inflammation, nerve damage (leading to neuropathy), hypertension, all of which increase risk for cardiovascular disease, renal disease, and stroke. Prediabetes affects more than 85 million Americans, of whom 25% are expected to develop Type 2 diabetes within 5 years of diagnosis without intervention. Prediabetes is an ideal target for preventive strategies as it increases a person's risk for serious chronic diseases and can be prevented through lifestyle modification. Almost 40% of people in the state of Nevada have been diagnosed with prediabetes, costing the state more than two billion dollars annually (ADA, 2015). In addition, there are approximately 10,000 new diagnoses of Type 2 diabetes annually in the state. In a state where over 25% of the population is physically inactive and over 25% are obese, both risk factors and precursors for the development of prediabetes and then Type 2 diabetes, preventive action is needed expeditiously. Evidence-based preventive action which includes 5 to 7% weight loss, at least 150 minutes or more of physical

activity weekly, and a diet high in nutrient-dense foods and low in simple sugars, are all taught, supported, and promoted in DPPs. National DPPs were created to bring evidence-based interventions into communities to decrease the incidence of prediabetes through increasing preventive behaviors by fostering self-management behaviors, which is also a Healthy People 2020 objective (United Health Foundation, 2019). The state of Nevada, with its over 750,000 persons with prediabetes, has only 10 DPPs, only two of which are in the Las Vegas area.

In Clark County Nevada, the focus of this project, hospitalizations from complications of diabetes is higher than the national average. (United Health Foundation, 2018). Goals and visions of the Southern Nevada Community Health Improvement Plan (CHIP) a community coalition designed to improve the health of southern Nevada includes: ensuring that all residents in southern Nevada have access to healthcare and human services, to promote health by increasing healthy behaviors which contribute to chronic disease, to promote health through informed policy making, and to ensure funding for the local public health system (Southern Nevada Health District, 2016). DPPs fall in line with the vision of CHIP and Healthy People 2020 objectives, as they help to improve the health of persons in the state, promote health and well-being of residents, improve the quality of life, decrease rates of chronic disease, decrease rates of mortality and morbidity, and ultimately decrease health care costs. The CDC in collaboration with the ADA, AMA, and the Ad Council have launched a national prediabetes awareness campaign whose goal is to improve awareness of prediabetes in health care providers and people at risk, to increase access to National DPPs, to increase coverage for lifestyle

change programs among public and private payers and employers, to improve screening and testing for prediabetes and to increase referrals to national DPPs for those who are eligible. The CDC's Division of Diabetes Translation, the leading organization in diabetes prevention efforts spent over 2.5 million dollars in diabetes prevention educational programs in the state of Nevada in 2016 in an effort to reduce the incidence of diabetes in the state by improving awareness of prediabetes among health care providers and those at risk and ultimately increase access to and enrollment in National DPP lifestyle change programs (CDC, 2019).

As mentioned above, there are only ten national CDC DPPs in the state of Nevada, for the over 750,000 persons diagnosed with prediabetes. In Clark County, Nevada, the focus of this study, there are only two. There is a lack of knowledge in health care providers, including nurses, of the benefits, availability, resources and funding to initiate DPPs nationally. There is also a lack of public knowledge about the high health risk of the diagnosis of prediabetes and of the availability of DPPs and health insurance coverage for such programs. According to Konchak, et al, (2016), the capacity to deliver DPP program lifestyle interventions has increased drastically, there still however is not enough programs available to meet the population demand. In the facility which is the focus of this project, prediabetes care is not a priority. There are no DPPs and referrals to such programs do not exist. Patients are simply informed of their diagnosis and encouraged to lose weight and increase physical activity, not adequately advised of the harms of prediabetes and the benefits of self-care, nor do they receive adequate support to

lose weight, increase activity, nor make dietary changes. All of which are key to type 2 diabetes prevention.

Preventing type 2 diabetes will require interventions from multiple levels of care, (which often begins with nurses) to ultimately encourage and enable lifelong lifestyle behavioral changes capable of reducing the harmful effects of elevated blood glucose levels (prediabetes). 5-10% of persons diagnosed with prediabetes develops diabetes each year, 70% will develop type 2 diabetes within a lifetime. With such staggering statistics, primary preventive measures are critical to reduce the future burden of the disease. Findings from the Diabetes Control and Complications Trial (DCCT) found that nurses are a major contributor to the improved quality of care for persons with prediabetes and diabetes. Nurses are primary educators, and make up the majority of diabetes educators. Nurses are the largest population of health care providers globally. Their primary focus is educating the population in health promotion and disease prevention. In prediabetes and diabetes care, nurses provide primary, secondary, and tertiary care with the aim of teaching and supporting lifestyle modifications to prevent disease and complications from disease. Nursing care has proven to improve the health of the population, reduce re-hospitalizations, reduce health care costs in chronic disease, improve self-care, and decrease visits to specialists (Peimani, Tabatabaei-Malazy, & Pajouhi, 2010). All nursing staff play an important role and have a responsibility in caring for patients at risk for diabetes, as all nurses at some point care for patients at risk for diabetes or who have diabetes. They also play a critical role in screening and supporting persons at risk for diabetes or who have been diagnosed with prediabetes, as they are often present at

diagnosis and are responsible for educating on self-care and management. Nurses are at the forefront of diabetes preventive efforts (Konchak, Moran, et al., 2016).

Role of the DNP student

I am a nurse practitioner, also the head of the diabetes education program at the health care facility where I am employed, and I am a CDC certified Prevent Type 2 (Prevent T2) diabetes lifestyle coach. I educate patients daily on self-care activities to help improve their diabetes outcomes, in hopes to prevent complications from disease. My department understands the need for a DPP, as we are all in agreement that prevention is more beneficial and less costly than management of the disease. The majority of the patients we see who have diabetes are type 2, most of whom say they were told at one time they had prediabetes by their primary care providers, but were told nonchalantly, as though the diagnosis of prediabetes is not that serious, as such they did not take it seriously. As an Endocrinology nurse practitioner and as a diabetes educator I know the importance of diabetes preventive programs, as type 2 diabetes is preventable. I also am aware of the harms of type 2 diabetes, as I deal with it daily (blindness, end-stage renal disease, peripheral neuropathy, myocardial infarctions, stroke, foot ulcers and amputations), all of which are preventable. If patients are motivated, and are then given the knowledge, support, and encouragement, they can make lifelong, effective changes and prevent development of this debilitating disease. As a Prevent T2 lifestyle coach I have seen firsthand the benefits of CDC DPPs. I have witnessed patients make informed decisions that led them to make effective lifestyle changes which ultimately lowered their A1c, improved their low-density cholesterol which contributed to lowered cardiovascular

and renal risk; and also decreased their risk of developing type 2 diabetes. I have also witnessed them have positive effects on their family members, who were at risk for the development of prediabetes or diabetes. Behavioral change requires individuals to be aware, supported and self-motivated, this is exactly what DPPs do, motivate, increase awareness, and provide support.

The only bias I foresee is that I am pro-DPP and it is my goal to improve knowledge and access for patients to these programs. Steps to prevent my own bias include: ensuring I am actively listening to the opinions of health care clinicians who are not in agreement with use of DPPs and then following up with evidence-based data if needed. I also understand that there will be some who will never approve or agree with DPPs and I am ok with this.

Summary

Improving knowledge and access to DPPs is critical, as type 2 diabetes is a national and global epidemic, which as mentioned many times in this writing, is preventable. Educating nurses and other primary care providers on the importance of managing prediabetes as opposed to managing type 2 diabetes is crucial. It is important for all health care clinicians to understand that prediabetes should be managed like any other disease; teach patients the role they play in prevention or to the development of the disease and focus on self-care interventions and self-responsibility. Prevention is more cost effective than managing this chronic disease which is responsible for poor health outcomes, hospitalizations, renal disease, blindness, lower limb amputations, cardiovascular disease, increased medical costs, poor quality of life, and increased

morbidity and mortality. Primary care is the best place to begin, as this is the area that sees patients most often and this is the area where most patients receive the initial diagnosis and are quite often counseled on prevention or management of the disease. Arming nurses with knowledge regarding the vital role they play in prevention of type 2 diabetes is critical, as they are most often the primary educators who patients trust and turn to most often for advice as it pertains to their health. Evidence has proven that nurses have a great impact on the health and wellness of the population (Boltri, et.al., 2007). Prevention and management of chronic health states requires a primary care system with multi-disciplined care teams who are knowledgeable, prepared, proactive, and resourceful (Konchak, Moran, et al., 2016). This research project's aim is to arm primary care teams with the knowledge, resources and preparedness they need to care for a growing population of patients who have prediabetes, so that patients receive the care they deserve; care all health care providers take an oath to give and which patients trust they are receiving.

Section 3: Collection and Analysis of Evidence

Introduction

Prediabetes is a preventable disease that if left untreated can become a chronic disease, Type 2 diabetes, a debilitating disease that increases a person's risk for cardiovascular disease, renal disease, ophthalmic disease, and limb amputations. The CDC has established national DPPs, which are evidence-based programs designed to prevent prediabetes from becoming Type 2 diabetes. These programs were established because research has shown that Type 2 diabetes is preventable in most cases or can be delayed with lifestyle modifications, with a 5-7% reduction in weight, at least 150 min of physical activity weekly, and dietary changes (CDC, 2018). CDC Prevent T2 programs provide, support and teach self-care lifestyle changes to persons diagnosed with prediabetes and have successfully decreased the incidence of Type 2 diabetes in participants. In participants aged 45 to 69, Prevent T2 programs have reduced the incidence of Type 2 diabetes by 58%, and in those 70 and older the reduction rate has been greater than 70%. Although Prevent T2 programs have demonstrated great success in reduction or delay of Type 2 diabetes, they remain underutilized. Research has shown that less than 10% of persons diagnosed with prediabetes have been referred to Prevent T2 programs (CDC, 2018). Reasons for underutilization of Prevent T2 programs include (a) lack of awareness among health care providers and patients of the availability and benefits of DPPs (identified as the number one reason) and that these programs are a covered health insurance service, (b) health care clinicians' ambivalence and personal feelings about diabetes preventive programs, (c) health care clinicians' lack of knowledge

of how to refer to programs, (d) health care clinicians' concerns about the appropriateness of DPPs for their patients, (e) provider preference to manage the disease on their own (even though most do not have the time), and (f) resistance to innovation (Suanert, et al., 2011).

The purpose of this DNP project is to increase awareness among nurses and other primary care providers and clinicians of the availability and benefits of DPPs, in an effort to improve referrals and access to DPPs for persons diagnosed with prediabetes with a goal of ultimately decreasing the incidence of Type 2 diabetes in the state of Nevada, a state with over 750,000 persons or 40% of the state diagnosed with prediabetes and a state with only 10 DPPs, only two of which are in the county where this project was conducted (ADA, 2015). Nevada is a state whose residents are at high risk for the development of prediabetes and Type 2 diabetes as over 25% report that they are physically inactive and over 25% are obese (both risk factors for the development of prediabetes and diabetes), and there are more than 10,000 new cases of prediabetes annually (United Health Foundation, 2019).

Increasing awareness among clinicians, which includes nurses, in the primary care setting will help to improve care and management of patients with diagnosis of prediabetes, as they are most often the clinicians who explain new diagnosis, management, and prevention of disease and who refer patients for preventive services. They are also patient advocates and care providers whom patients most often direct their questions for care and management of disease. Lastly, nurses most often process referrals and are aware of community resources for care options. Nursing education and care has

proven to be the most cost-effective care for improving the health of the population (Peimani et al., 2010).

A staff educational model was used to increase clinician awareness. The educational model was presented by way of a PowerPoint presentation and an educational brochure. Staff, which includes primary care teams of nurses and health care clinicians were then given a post questionnaire designed to assess their opinions and knowledge of DPPs. Data from the questionnaires was interpreted via descriptive analysis.

I chose the theory of diffusion as the guide for this project as it explains the most natural method by which new ideas and concepts spread through an organization or through a society. Obtaining buy in from a select few key stakeholders will most often help others within the organizations accept and utilize the innovation (Glanz, Rimer, & Lewis, 2002). The theory holds that adoption of an innovation occurs at varying levels and must be simple, compatible with the present system, must have observability, trialability, must be communicable, pervasive, profitable, and more efficient than alternatives or the present way of doing things (Dearing, 2010).

Practice-Focused Question

DPPs are an evidence-based, cost-effective method to decrease the burden of Type 2 diabetes nationally, yet only about 10% of the population is referred for these services. Research has shown that referrals to DPPs are low because of clinician and patient lack of knowledge as it relates to the availability and benefits of DPPs, lack of ease in referring to DPPs, and clinician attitudes and opinions of benefits and need for use of DPPs (Sunaert, et al., 2011). A staff educational model will and does increase

clinician knowledge and awareness of the benefits of DPP programs, and will hopefully increase access and referrals to DPP programs.

Nevada, a state with over 750,000 persons diagnosed with prediabetes, almost 40% of the population with approximately 10,000 new diagnosis annually, and over two billion dollars spent annually for diabetes and prediabetes care does not have adequate availability and access to DPPs (United Health Foundation, 2019). There are only 10 programs in the state and only one in Las Vegas, two in Clark County. There is clearly a need for more programs, increased access to programs and referrals to DPPs to decrease the incidence of Type 2 diabetes in the state. Increasing access will provide patients diagnosed with prediabetes the tools and opportunities they need to decrease their risk of developing Type 2 diabetes, which will also decrease their risk of developing numerous other chronic conditions associated with the disease, ultimately improving the health of the community.

A needs assessment performed with primary care medical directors, with endocrinology providers and the medical director of endocrinology at the project site revealed that clinicians feel that there is a great need for better management of patients with a diagnosis of prediabetes and that a DPP program within the facility is greatly needed. Patients treated in the primary care setting state that when given the diagnosis of prediabetes, they were simply told that they need to lose weight and increase their physical activity; they were not given specific instructions or support on how to do either. The facility treats over 300,000 patients annually, 12,000 of whom have a diagnosis of diabetes, over 90% have a diagnosis of type 2 diabetes, and a great number of

prediabetics or patients with an A1c greater than 5.7% but less than 6.4%, yet the facility does not have a DPP.

A gap in practice clearly exists, as patients are not being referred to this health promotion and disease prevention program that has shown clear benefits in prevention of Type 2 diabetes. Nurse educators and case managers within the facility understand that Type 2 diabetes is preventable, but many are unaware of the availability of DPPs within the area or the need for more DPPs, or resources available for them to develop or encourage the development of such programs. Nurses are most often the primary resource for community services, the primary source of referral generations, and the primary patient educators who have proven to be the most cost-effective care for improving the health of the population (Peimani et al., 2010). Arming nurses with knowledge of their ability and need to refer to and even develop DPPs will help them provide patients and the community with the information, access, support, and resources needed to prevent or delay the development of Type 2 diabetes.

Sources of Evidence

Peer-reviewed randomized control trials, systematic reviews, qualitative studies, and mixed methods studies were reviewed and chosen as evidence for this project from sources such as the ADA, the AADE, the AMA, the National Institutes of Health, the American Journal of Public Health, the National Diabetes Prevention Program, the CDC, and the Diabetes Prevention Research Group. I selected articles based on chronology (articles older than 10 years old were excluded), relevance to topic, and strength of the source, with preference given to peer reviewed articles.

Research has shown that lifestyle modifications taught and supported in CDC National DPPs, also known as Prevent T2 programs reduce (by 58-71%) or delay (by 10 years) the incidence of Type 2 diabetes in persons aged 45 and older (CDC, 2018). Self-care practices are the key to diabetes prevention, as such self-care practices must be taught and supported in those at risk for the development of Type 2 diabetes. Self-care practices include: 5 to 7% weight loss, at least 150 minutes or more of physical activity a week, eating a diet high in nutrient dense foods and low in simple sugars and calories, and lastly coping strategies for management of stress (CDC, 2018).

The AADE (2016) states that if the health care arena wishes to reduce cost and change the course of diabetes in this country, it must prevent the conversion of prediabetes to Type 2 diabetes. The National Diabetes Prevention Program and the CDC recognize that lifestyle interventions reduce the incidence of diabetes by 58% among individuals diagnosed with prediabetes aged 45 to 59 and by over 70% in those aged 60 and older. Both organizations also report that lifestyle interventions help to mitigate the health and economic issues associated with prediabetes (Khan et al., 2017). Research has shown that10 years after attending and completing a CDC-recognized DPP, participants were one-third less likely to develop Type 2 diabetes than individuals who did not attend a DPP (CDC, 2018). According to the ADA, persons who have been diagnosed with prediabetes should be referred to intensive behavioral lifestyle intervention programs modeled on DPP guides, to achieve weight loss and lifestyle modifications needed to prevent Type 2 diabetes (Ray et al., 2017). The Diabetes Prevention Research Group found that lifestyle interventions (performed under the guidance of a Prevent T2 lifestyle

coach) prevented the diagnosis of Type 2 diabetes in one in every seven persons for three years (Castro et al., 2008).

There is increasing awareness about the importance of self-care in the management of chronic disease. How and what patients do on a daily basis to manage disease has a major influence on their outcomes. Most individuals require support to obtain the knowledge, skill, and confidence to cope with managing chronic disease. DPPs provides just that, support, knowledge, skill, and helps to increase self-confidence to prevent diabetes. There is a growing body of evidence that suggests that engagement of health care professionals is critical for the use, development, and establishment of DPPs (Peimani, et al., 2010). Lack of integration of such programs in primary care has resulted in the lack of referrals to DPPs. As such, referrals from primary care providers has been identified as an important factor to enhance patient participation in DPPs and it has been established that participation and engagement of primary care clinicians, which includes nurses is critical for successful application of interventions and skills taught in DPPs (Peimani et al., 2010).

As mentioned earlier, less than 10% of patients diagnosed with prediabetes are referred to DPPs. Understanding why has been the focus of many studies. Such studies have identified reasons such as: personal attitudes (by clinicians and patients) towards DPPs, lack of knowledge of benefits of DPPs, lack of knowledge about availability of DPPs, concerns about the appropriateness for DPPs for certain patient populations, ambivalence about encouraging certain patients into self-management, preference to manage the disease on their own, fear and frustration about primary care providers role in

prediabetes management, resistance to innovation, and some feel threatened by DPPs, as they are unsure if they will replace them in management of their patients who have prediabetes, and lastly unawareness of how to refer to DPPs (Sunaert et al., 2011).

With effective preventive programs patient outcomes will improve, the incidence of type 2 diabetes will decrease significantly, and the burden of the disease on the U.S. health care system will reduce significantly (AAFP, 2019). The AMA concluded in a study of twenty-six primary care practices in seventeen health facilities in the U.S., that after implementation of a program designed to increase awareness of DPPs through use of a clinician education program utilizing the AMA's Diabetes Prevention Toolkit with the addition of EMR tools, alerts, and guidelines that referrals to DPPs increased (n = 4,601). The study concluded that referrals in the twenty-six clinics went from zero to five thousand and that over 55% of clinical staff stated that they were aware of DPPs and resources within their community on pre-survey, and over 80% were aware post-survey/intervention. The study further concluded that diabetes prevention methods should be a team effort, as increased team awareness increases team buy-in and collaboration in preventive methods (Holliday, Williams, Salcedo, & Kandula, 2019).

In a clustered randomized controlled study, performed in two primary care clinics, done to evaluate patient and clinician's attitudes and practices regarding prediabetes care, it was concluded that clinicians who participated in the study had low awareness of DPPs, but had positive attitudes about prediabetes treatment and management. Electronic health records (EHR) of over 4000 patients were reviewed during the study. It was found that over 50% of the charts reviewed had a diagnosis of prediabetes and none of those

diagnosed were referred to DPPs. 97% of clinicians who participated in the study believed prediabetes is an important health issue, and all clinicians believed treatment of prediabetes is an important part of management of the disease. Eight months post-intervention (established prediabetes guidelines and alerts added to EHR), there was a 5% increase in referrals to DPPs of patients diagnosed with prediabetes, compared to control clusters, referrals were done only 0.7% of the time. The study concluded that barriers to referrals to DPPs included: clinician and patient unawareness of DPPs, clinician and patient unawareness of insurance coverage for DPPs, perceptions about DPPs (belief that DPPs were ineffective), and lack of a streamlined electronic referral process (Keck, Robert, et al., 2019).

A qualitative study performed using semi-structured interviews with fifteen primary care providers (PCPs) from large, urban primary care practices affiliated with an academic medical center and school designed to examine the attitudes and perspectives regarding diabetes and its management, it was concluded that: diagnosing patients with prediabetes was an opportunity to educate and motivate patients to make lifestyle changes and lose weight, few providers felt that a diagnosis of prediabetes required pharmacological treatment, rather they felt it was time to educate patients on how to avoid developing type 2 diabetes, and almost all providers felt that lifestyle changes is a better option for treatment and management of prediabetes over Metformin because it is more effective as proven in the Diabetes Prevention Trial (Kandula et al., 2018). The study also found that while clinicians were aware of the recommended clinical guidelines and evidence-based practice of referring patients to DPPs barriers existed which

prevented them from following established guidelines which include: lack of available DPPs, no referral mechanism available in their EHR system, and the financial cost of DPPs. Lastly the study concluded that PCPs strongly prefer intensive lifestyle modifications over other methods for management of prediabetes (Kandula et al., 2018).

The Journal of American Board of Family Medicine found that while clinicians are very skilled in screening for and managing diabetes, raising awareness for National DPPs is still needed, as they do not diagnose, nor adequately treat and manage prediabetes as national guidelines suggest (Keck, 2019). The Board concluded that 97% of clinicians surveyed knew the criteria for diagnosis of prediabetes, every clinician agreed that lifestyle modifications are effective in preventing or delaying the onset of type 2 diabetes, 94% of clinicians felt prediabetes is a significant public health issues, over 60% felt screening for prediabetes is a high priority, yet only 45% were aware of National DPPs and less than 50% knew how to refer to DPPs (Keck, 2019).

Nurses can and do make a significant dent in the rate of lowering the rate and effect of prediabetes in the population. According to the American Nurses Association (2016), nurses play a significant role in the dissemination of health information and in preventive health efforts, all of which keeps the population healthy and as free from disease as possible. In a randomized controlled trial performed in a primary care setting focusing exclusively on the ability of nurse practitioners (NPs) ability to translate DPPs lifestyle change interventions it was found that participants who partook in the lifestyle program had improved high density lipoprotein (HDL), improved exercise behavior, and met the 5% weight loss goals compared to standard care participants. Participants were

all patients cared for by the NPs who had a diagnosis of prediabetes (n=58), with an acceptance rate of 78%. The average length of the program was 9 months, with 98% attendance rate and low attrition; on 12%. The study concluded that a lifestyle program based on CDC Prevent T2 model can be implemented successfully in the primary care setting by NPs (Whittemore et al., 2009). Educating nurses on diabetes preventive measures will help to increase access to DPPs within communities and will also help to lower the incidence of type 2 diabetes. Nurses are front-line providers whose decisions and input increases knowledge, awareness, and fosters change (Bradshaw, 2010).

Research obtained from diabetes prevention trials and from other mainstream research organizations has substantiated and confirmed that diabetes preventive programs are effective methods to decrease the incidence of type 2 diabetes, yet there remains a gap in practice. Clinicians, according to recent evidence are not following evidence-based practice and clinical guides for treatment and management of prediabetes, as they are not referring persons diagnosed with prediabetes to DPPs. Finally, research demonstrates that educating clinicians on the benefits of DPPs will increase access and referrals to this needed service Keck, Roper, Thomas, & Hieronymus, 2019).

Evidence Generated for the Doctoral Project

The main purpose of this project is to increase awareness in primary care clinicians of the benefits and need of national DPPs by way a staff educational model, with the ultimate goal of increasing access and referrals to DPPs. A needs assessment performed in conjunction with primary care and endocrinology providers at the health care facility where the study will be performed found that there are no DPPs within the

facility, there are only two in the county where the facility exists, and finally, there is a great need for more DPPs in the area, particularly within the facility as most patients treated within the facility are not referred to DPPs. To create the staff education model, the suggested clinical guidelines and evidence-based recommendations for management of prediabetes set forth by the ADA, the USPSTF, the American Association of Clinical Endocrinologists, the AADE, the National Diabetes Research Group, and the CDC were utilized. The educational model provides statistical data revealing the decreased rates of conversion of participants in DPPs from prediabetes to type 2 diabetes, the ease of developing and referring to DPPs, program methods and guidelines, and health insurance coverage for DPPs. The module also consists of a brochure which can be used to educate patients.

Participants

Staff participants included three primary care providers, three nurses, and three endocrinology providers, all of whom provide care to patients diagnosed with prediabetes on a regular basis. The staff chosen were selected because they are considered experts in care of patients with diabetes and as mentioned above because they provide care regularly to persons diagnosed with prediabetes and diabetes, also because these providers are key stakeholders in decision making within the organization. Obtaining buy in from these providers will increase buy in and increase awareness of the benefit of DPPs, as they can encourage buy in from upper management and get the ball rolling in creating a DPP program within the organization and encourage more providers to refer their patients to DPP services. Dissemination of an innovation begins with a small select

few and then diffuses through a social group or organization (Dearing, 2010). Three participants from each area were chosen because this number helps to generalize the population of providers at the health care facility.

Procedures

All staff were given a prediabetes staff educational model in the form of a PowerPoint document. Thirty days following the administration of the educational model the staff were given a post questionnaire to assess their opinions and knowledge of DPPs. Data from the questionnaires was then interpreted using descriptive analysis. The staff educational model and the questionnaire were developed from data attained from the CDC Prevent T2 program guidelines for certified lifestyle coaches. The study participants agreed that increase knowledge will help improve access to DPP programs.

Ethical Considerations

No part of this project harmed human subjects, as no intervention was performed on patients and no patient data was used. Anonymity of participants was maintained, as participants were identified by subject numbers only. The project took place at a health care facility in Nevada; a facility which provides both primary care and specialty care to over 30,000 persons. At no time was the facility mentioned by name.

Analysis and Synthesis

To maintain anonymity and integrity of the project, all participants identity remained anonymous as all questionnaires were numbered before they were given to participants and they will be handed out randomly. Participants were given thirty days to complete the educational model. They were then given the post questionnaire. A thirty-

day time frame was chosen as it gave participants time to reflect on what they've learned and to see if it had changed their opinions or increased their knowledge of DPPs. In addition, it allowed time for them to refer, or consider referring patients to DPPs or possibly consider implementing a program within the facility. To ensure all participants remain on track they were sent email reminders of deadlines along with an email receipt confirmation. All data was collected by the writer only and kept in a file of which only the writer had access. Data was interpreted via descriptive analysis.

Summary

Health care clinicians, including nurses are the first line of defense in prevention of disease. If they lack the necessary knowledge to prevent or manage disease, then the population suffers. A recent study published in the Journal of General Internal Medicine reports over 30% of health care providers are unaware of the risk factors, prevention and management of prediabetes (Dyson, 2019). The study also found that of the 300 health care clinicians surveyed, only a little over 40% knew the correct value to diagnose prediabetes. This same study suggests that clinician's gaps in knowledge contributes to underscreening, misdiagnosis, and inadequate management of prediabetes, which in turn prevents adequate referrals to DPPs; leading to the increasing number of type 2 diabetes diagnosis (Dyson, 2019). Primary care providers are an important venue for diabetes preventive efforts as they treat over 350 million patients annually (Sunaert, 2011). While they treat such a large number of patients, they are also found to infrequently provide adequate support, treatment, or counseling to those diagnosed with prediabetes. This correlates to the fact that by the time most people are diagnosed with type 2 diabetes,

they've had the disease for at least nine to twelve years, at which time the disease has already done significant microvascular and macrovascular damage. All mentioned complications are a result of impaired glucose tolerance leading to glucose toxicity; a condition which has negative effects on organs and tissues of the body. Lifestyle modifications taught and supported in DPPs can prevent such complications. Arming health care providers and patients with the knowledge they need to prevent type 2 diabetes is a key to correcting this issue. Shedding light on national DPPs and their benefits will help bridge the gap between evidence-based research and clinical practice; improving care and outcomes for society and decreasing the incidence of this potentially chronic, debilitating disease.

It is estimated that of the over 85 million Americans who have been diagnosed with prediabetes, over 70% will develop type 2 diabetes without intervention (CDC, 2017). The Diabetes Prevention Trial, one of the largest diabetes prevention trials has established that intensive lifestyle interventions that promote healthy eating, weight loss, and regular physical activity can reduce the incidence of type 2 diabetes by as much as 58% and decreases the rate of diagnosis of type 2 diabetes by 15 or more years, reduces microvascular and macrovascular disease, cardiovascular mortality, and all-cause mortality (CDC, 2017).

It is time for a paradigm shift, the U.S. health care system must no longer take a reactive position when it comes to disease management, but must be proactive and focus on disease prevention interventions, especially since over 35% of the U.S. population is at risk for the development of type 2 diabetes (United Health Foundation, 2019) . The

USPSTF evidence-based guidelines for patients who are found to have abnormal glucose tolerance (prediabetes), have gestational diabetes, or are obese includes encouraging patients to eat a healthy diet, increase physical activity, and lose weight. All of these guideline recommendations can be met in participating in DPPs. Bridging the gap between the knowledge deficit which exists in health care clinicians as it pertains to evidence-based methods for managing prediabetes is imperative. Doing so will bring attention to the benefits of DPPs and will increase momentum around the development and use of prediabetes preventive measures.

Section 4: Findings and Recommendations

Introduction

Diabetes, a chronic disease affecting more than 10% of Americans, is a public health crisis. It is responsible for increased mortality, morbidity, and lost productivity. The economic burden of prediabetes is equally troubling, as it sheds light on the potential future burden of diabetes and stresses the need for immediate diabetes preventive efforts. Prediabetes affects more than 10 million adults, increases a person's risk for cardiovascular disease, renal disease, hypertension, and stroke, and it is estimated that within three to five years 15-30% of those diagnosed with the disease will develop Type 2 diabetes without intervention (CDC, 2017). Over 35% of residents in the state of Nevada has been diagnosed with the disease, there are approximately 10,000 new diagnoses annually in the state, and the cost of care for prediabetes and diabetes is over two million dollars annually (ADA, 2015).

Lifestyle modifications taught in DPPs have proven to reduce the incidence of Type 2 diabetes by 58-71%, delay the onset of those with Type 2 diabetes by 10 years, improve cardiovascular disease risk factors, and reduce health care costs by over $500 billion. The ADA and the Community Preventive Task Force recommend the use of lifestyle interventions such as weight loss and increased physical activity in health care systems and communities to prevent Type 2 diabetes (CDC, 2017). With a population that is aging, sedentary, chronically ill, and overweight, which are all contributing factors to the development of Type 2 diabetes, interventions to decrease or prevent the incidence of the disease are vital, or the burden of the disease will continue to increase. CDC-

recognized DPPs have proven to be one of the most effective methods to prevent Type 2 diabetes, yet only 70 programs exist across 22 states. There are only 10 in the state of Nevada, with only one in the city where this project takes place, a city with an estimated 787,000 (> 35%) of people diagnosed with prediabetes (United Health Foundation, 2019).

This project is designed to address the inadequate use of DPPs, a crucial intervention for a crucial health issue. Targeting nurses and other health care providers in the primary care setting, (increasing awareness of the benefits of DPPs) is an essential area to begin educating and encouraging health care clinicians about the need for increased preventive measures for Type 2 diabetes, as these are the providers who are most in contact with persons diagnosed with prediabetes, provide the greatest amount of education to patients, and do a great majority of referral services for preventive care and disease management. Primary care clinicians treat 90% of patients who have diabetes or are at risk for the development of diabetes, so targeting them and their staff will benefit a large patient population (AAFP, 2019).

Gap in Practice

A gap in practice clearly exists, as patients are not being referred to this health promotion and disease prevention program that has shown clear benefits in prevention of Type 2 diabetes. Nurse educators and case managers within the facility understand that this disease is preventable, but many are unaware of the availability of DPPs within the area or the need for more DPPs, or resources available for them to develop or encourage the development of such programs. Nurses are most often the primary resource for

community services, the primary source of referral generations, and the primary patient educators who have proven to give the most cost-effective care for improving the health of the population (Peimani et al., 2010). Arming nurses with knowledge of their ability and need to refer and even develop DPPs will help to provide patients and the community with the information, access, support, and resources needed to prevent or delay the development of Type 2 diabetes.

Sources of Evidence

Sources of evidence for this project were obtained from reputable sources such as the AADE, the ADA, the AMA, the American Journal of Public Health, the National Diabetes Prevention Program, the CDC, the National Institutes of Health, and the Diabetes Prevention Research Group. Peer-reviewed randomized control trials, systematic reviews, qualitative studies, and mixed methods studies were carefully selected, reviewed, and preferred as sources of evidence for this project. Databases such as CINAHL, Ovid Plus, Nursing Journals, PubMed, university sites and professional organizations were also used to locate relevant evidence. Keywords used to locate pertinent data include *prediabetes, diabetes prevention programs, referrals to diabetes pr*evention *programs, type 2 diabetes, diabetes education, diabetes prevention, lifestyle modifications for diabetes, nurses and diabetes, nurses and diabetes prevention, nurses and diabetes education, nurses and prediabetes, primary care and prediabetes, primary care and diabetes prevention,* and *management of prediabetes.* Articles were selected based on timing (none older than 10 years), relevance to the topic, strength of the source and data, with preference given to peer reviewed articles.

Findings and Implications

The AADE states that if the health care arena wishes to reduce cost and change the course of diabetes in this country, it must prevent the conversion of prediabetes to Type 2 diabetes (Troupe, 2017). There is a growing body of evidence that suggests that engagement of health care professionals is critical for the use, development, and establishment of DPPs. Lack of integration of such programs in primary care has resulted in the lack of referrals to DPPs. As such, referrals from primary care providers has been identified as an important factor to enhance patient participation in DPPs, and it has been established that participation and engagement of primary care clinicians, which includes nurses, is critical for successful application of interventions and skills taught in DPPs (Peimani et al., 2010).

Analysis and Synthesis of Evidence

Nine health care professionals were chosen to participate in this study based on their expertise in diabetes care. These participants included three chronic care nurse managers, three advanced practice providers, and three physicians. Each was given a copy of the staff educational model in the form of a PowerPoint presentation for review. They were allotted 30 days to review the model and were then given a post questionnaire to complete, which was designed to assess their opinions and knowledge, following review of the staff educational model. After completion of the model, it was found that all clinicians agreed that prediabetes is a serious condition that often goes untreated. Ninety percent agreed that with early diagnosis and treatment prediabetes can be reversed and that increasing knowledge of DPPs can increase access to such programs. In addition,

90% of clinicians surveyed agreed that lifestyle changes taught in DPPs will improve outcomes for patients diagnosed with prediabetes, and that there is a need for increased referrals to DPPs. Yet, one third of said clinicians did not agree that without treatment, 15 to 30% of persons diagnosed with prediabetes will develop Type 2 diabetes. Lastly, all agreed or strongly agreed that DPPs can be established and facilitated by all levels of health care providers and such programs can receive reimbursement from Medicare and other insurance carriers.

Implications of Findings

As a result of this project, a prediabetes task force has been established within the health care organization where the project was performed. The task force focus is designed to improve outcomes for patients diagnosed with prediabetes. One such way to improve outcomes for patients is through providing regular education to clinicians, by hanging posters in clinics, sending regular correspondence via emails on evidence-based prediabetes guidelines and care, and giving presentations at quarterly provider and staff meetings. The task force is in the process of developing prediabetes guidelines for the electronic health system. The guidelines will alert clinicians when they are treating a patient with a diagnosis of prediabetes and will provide evidence-based guidelines to clinicians for treatment of these patients. The EHR will also allow clinicians to print patient educational materials for prediabetes care. The task force is also considering initiating a diabetes prevention pilot program (a precursor to starting a CDC Prevent T2 DPP program), which will be based on CDC Prevent T2 DPP guides. Participants will be employees of the facility. Using alerts, inserting evidence-based guidelines within the

electronic health system, use of emails, presentations, and other forms of mass media will help improve care to patients with prediabetes by helping diffuse and establish prediabetes care interventions throughout the facility (to health care clinicians and patients). These measures will also make clinicians more cognizant of utilizing evidence-based interventions when providing care to patients who are prediabetic. This will also help diffuse and disseminate prediabetes interventions into partnering health care facilities and to the surrounding community. Hopefully, utilizing guidelines, educating clinicians and patients will encourage the development of CDC Prevent T2 programs within local religious organizations, universities, YMCAs, and local community centers. I have partnered with my religious organization to start a CDC Prevent T2 program, an organization with a high membership of obese, sedentary, minorities at risk for the development of prediabetes. The goal is to have the program up and running by Fall of 2020. My long-term goal is to establish DPPs nationwide in minority communities.

Implications to Positive Social Change

Decreasing the incidence of Type 2 diabetes in the United States will help improve the health of the nation and will help decrease health care costs related to diabetes and diabetes complications. Dissemination of preventive efforts begins with small changes and then leads to larger, established change within the communities and to the populous. Educating the population on self-care methods, the most effective methods in disease prevention, will decrease the incidence of this chronic disease and will contribute to the improvement of the health and well-being of generations. The AADE has stated that if the health care arena wishes to reduce cost, change the course of

diabetes in the county, and improve the health of the population, it must prevent the conversion of prediabetes to Type 2 diabetes (Troupe, 2017). Successful examples of dissemination of preventive efforts includes smoking cessation campaigns, promotion of breast cancer, cervical cancer, prostate cancer screenings, nutritional campaigns, immunization campaigns, and lastly hand hygiene campaigns. All efforts included partnering with local health care clinicians, local and state health departments, and communities to make lasting changes and improvement within the population. DPPs do just that: they encourage partnerships between health care organizations and communities to teach and support lasting lifestyle modifications that decrease or reduce the incidence of diabetes. This project should encourage nurses and other clinicians to utilize and promote the development and use of DPPs throughout Las Vegas, throughout the state of Nevada, and throughout the country to decrease the incidence of Type 2 diabetes.

Recommendations

Arming clinicians with evidence-based guidelines ensures that they are giving care that is of the best quality, cost-effective, free from bias, and is in accordance with patient preference. It is through dissemination of evidence that acquired knowledge is shared, utilized and further innovations are inspired (Williams & Cullen, 2016). Dissemination of evidence is and must remain a priority in health care, should drive clinical practice decisions and helps to ensure needed change occurs to improve the delivery of care. Nurses are in the front line of health care delivery, as such nurse lead research is critical to effective clinical decision making and practice, and contributes tremendously to improved patient outcomes (Curtis, Fry, Shaban, & Considine, 2017).

Continuing to encourage nurse led research efforts such as this one, ensures that nurses are and remain a valuable, effective member of the health care team, and ensures nurses maintain their oath of providing quality care to all. Knowledge of diabetes prevention guidelines, which includes the use of DPPs will contribute to further nurse led research, improve knowledge, encourage the development of further innovations in diabetes care, and will help improve patient outcomes. Sharing information from this project with clinicians within the project site, will encourage sharing of this information with other health care clinicians within the facility, throughout the city, surrounding communities, state, and eventually the nation. Dissemination of knowledge begins with a small subset and then diffuses throughout communities. Diffusion and dissemination of this research will hopefully lead to increased access to DPPs, decreased incidence of type 2 diabetes, and lastly improved patient outcomes. The development of a diabetes task force at the facility where this research was performed is a beacon which will shed light on the journey to improved care and outcomes for patients diagnosed with prediabetes treated at the facility. It will help ensure evidence-based interventions are utilized, understood, or at least considered at every turn. Establishing a CDC Prevent T2 program will do the same.

Strengths and Limitations of the Project

Strengths of this project are many: improved knowledge of evidence-based diabetes prevention guidelines, dissemination of diabetes prevention guidelines, and improved awareness of the benefits of DPPs and interventions at the largest health care provider in the state of Nevada. Additional strengths include: random sampling of participants, small sample size, anonymity of participants and research site maintained,

project utilized moderate expenditure of resources, reliability and validity maintained, and personal bias avoided. Limitations include sample population may not necessarily be generalized, limited data due to sample size, limited research in this area. For successful future research efforts, it is recommended that the sample population is larger and more generalized, in addition the administration of a pre-questionnaire would be useful for assessment of changes in opinions and knowledge. Further research is also needed on the long-term benefits or lack thereof of diabetes prevention interventions and programs.

Section 5: Dissemination Plan

Type 2 diabetes is a preventable disease affecting one in ten Americans and the incidence is expected to increase to one in three without intervention. Prediabetes is the precursor to the diagnosis of Type 2 diabetes. Prediabetes affects over 84 million Americans, over 750,000 of them are Nevadans with approximately 10,000 new diagnosis annually in the state (ADA, 2015). DPPs, in particular CDC's Prevent T2, are evidence-based interventions proven to prevent or delay the incidence of Type 2 diabetes. While Prevent T2 programs have proven to significantly decrease, delay, or prevent the incidence of the disease, there are insufficient numbers of programs in the country and in the state of Nevada. In Nevada, a state where approximately 40% of the adult population suffers from prediabetes, there are only 10 DPPs (Weiss & Mwalili, 2018). In Clark County, Nevada, where this research project was performed, there is only one DPP, an area where approximately 10% of the population has been diagnosed with prediabetes.

This project was designed to increase knowledge in health care clinicians in the primary care setting with hopes to increase patient access to DPPs, with the ultimate goal of improving patient outcomes and reducing health care costs through decreasing the incidence or Type 2 diabetes in residents in Clark County, Nevada. My hope is that this research will encourage key stakeholders (primary care clinicians) at my place of employment (a health care facility caring for over 300,000) to approve and support the development of a CDC Prevent T2 DPP within the facility. To further encourage the development of a CDC Prevent T2 program, I have become a CDC certified Prevent T2 lifestyle coach and have partnered with the medical director of endocrinology who also

sees the need and the benefit of a DPP within the organization to establish a program within the organization. Establishing a Prevent T2 program within the organization will help to improve access for adults aged 18 and older diagnosed with prediabetes who are cared for within the organization and eventually for those diagnosed outside the organization, and it will help improve outcomes of those diagnosed with disease.

Developing a successful Prevent T2 program within the facility would help to disseminate the importance and benefits of prediabetes management throughout the organization and to clinicians in organizations in the metro area, in the state, and eventually in the country. Establishing a DPP will help disseminate evidence attained from diabetes prevention research and could create momentum for improved management of prediabetes, thus increasing referrals to DPPs and increasing access to more DPPs through the establishment of new programs. It will also make nurses and other health care clinicians aware of their ability to develop and facilitate such programs and lastly will encourage them to partner with organizations within their communities to develop and establish DPPs.

Analysis of Self

As a nurse practitioner whose primary duty is caring for and educating patients and staff in the management of diabetes, diabetes prevention, prevention of complications from the disease, and who is also a primary care clinician, I realized that the majority of the patients I and my department care for and educate suffered from Type 2 diabetes, a preventable disease. It is clear that prevention of the disease is more affordable and more sensible than the cost of management of the disease. It is also clear that CDC Prevent T2

programs are affordable, viable, effective solutions for prevention of Type 2 diabetes. Evidence-based practice has shown that lifestyle interventions taught and supported by CDC Prevent T2 programs reduce the incidence of Type 2 diabetes or delay the onset of the disease by 58-71%, improve cardiovascular disease risk factors, and reduce health care costs by over $500 billion (CDC, 2017). I have dedicated my career to diabetes, its prevention, and its management, in hopes of preventing the incidence of the preventable complications and harm of this debilitating disease. Consequently, I feel it is my duty to develop DPPs, to encourage other clinicians to develop such programs, and to arm nurses and other clinicians with current, evidence-based knowledge of prediabetes care so they also may use this knowledge to care for those with prediabetes and impart prediabetes interventions to their colleagues, patients, and their families. Lastly, I am compelled to encourage further research in prediabetes and diabetes care.

This project was beneficial to my practice as a nurse practitioner. The more I delved into evidence-based practice in prediabetes care, the more certain I was of the importance and benefits of DPPs. All clinicians chosen were considered experts in diabetes care, all admitted that Type 2 diabetes is preventable through lifestyle modifications, and most agreed that there is not enough focus in this area. Challenges to completion of the project lay mainly in getting clinicians, who agreed to participate in the study, to return the post questionnaire. Performing this project provided insight into the need for further nurse research as it pertains to diabetes, prediabetes, and obesity care. I believe that clinicians need to focus more on obesity management earlier in life to make a more lasting impact in prediabetes and Type 2 diabetes prevention. Focusing

interventions on children (middle schoolers), teaching them healthy eating habits and encouraging them to remain physically active to prevent obesity, a major contributing factor to prediabetes and Type 2 diabetes, seems reasonable and seems as though it would be very impactful in diabetes prevention efforts. Research has shown that about one third of children in America are overweight, which is closely related to the increased incidence of Type 2 diabetes in children, a disease which was once known as adult-onset diabetes (CDC, 2017). In addition, obesity is directly correlated to insulin resistance, which triggers hyperglycemia and inflammatory states within the body. Decreasing the obesity rate in children will decrease the number of individuals at risk for insulin resistance, hyperglycemia, inflammatory conditions, and Type 2 diabetes. At present, there are no CDC Prevent T2 programs for children, but it is my hope that nurses and other clinicians will be encouraged to focus research and preventive efforts in this area as it is clear that by the time most adults are diagnosed with prediabetes and Type 2 diabetes, microvascular and macrovascular damage has already occurred. It is my desire to develop focus groups with my colleagues, in particular diabetes educators, to get the ball rolling on preventive measures in children.

Summary

Type 2 diabetes has posed a considerable burden on the U.S. health care system. It is responsible for renal failure, cardiovascular disease, limb amputations, and blindness. It contributes to the rate of depression, anxiety, sleep disorders, and lost productivity in the country. It is a preventable, chronic disease that requires more focus and attention. This project is designed to be a reminder of the need to intensify efforts in

Type 2 diabetes prevention endeavors, to increase awareness in primary care clinicians of the need to provide improved care to patients diagnosed with prediabetes, and to encourage the use of evidence-based interventions taught and supported in CDC Prevent T2 diabetes prevention classes.

References

American Academy of Family Physicians. (2019, August 16). New research examines FPs' prediabetes knowledge, practice. Retrieved from https://www.aafp.org/news/health-of-the-public/20190816prediabetesstudy.html

American Association of Diabetes Educators. (2016). Special considerations in the management of older persons with diabetes: AADE practice synopsis. Retrieved from https://www.diabeteseducator.org/docs/default-source/default-document-library/special-considerations-in-the-management-of-older-persons-with-diabetes.pdf?sfvrsn=0

American Diabetes Association. (2015). The burden of diabetes in Nevada. Retrieved from http://main.diabetes.org/dorg/PDFs/Advocacy/burden-of-diabetes/nevada.pdf

American Diabetes Association. (2018). Economic Costs of Diabetes in the U.S. in 2017. *Diabetes Care. https://doi.org/10.2337/dci18-007*

American Hospital Association. (2018, January 10). Nurse watch: Nurses again to Gallop Poll of most trusted profession and other nurse news. Retrieved from http://www.aha.org/news/insights-and-analysis/2018-01-10-nurse-watch-nurses-again-in-top-gallup-poll-trusted-professions.

Boltri, J. M., Okosun, I., Davis-Smith, Y. M., Seale, J. P., Roman, P., & Toben, B. W. (2007). A simple nurse-based prompt increases screening and prevention counseling for diabetes. *Diabetes Research & Clinical Practice, 75*(1), 81-87. https://doi.org/10.1016/j.diabres.2006.05.002

Castro, F., Shaibi, G., & Boehm-Smith, E. (2009, February). Ecodevelopmental contexts for prevention of type 2 diabetes in Latino and other racially/ethnic minority populations. *Journal of Behavioral Medicine, 32*(1). doi:10.1007/s10865-008-9194-z

Centers for Disease Prevention and Control. (2017a). Prevalence of prediabetes. Retrieved from http://www.cdc.gov/diabetes/data/statistics-report/prevalence.html

Centers for Disease Prevention and Control. (2017b). Prevent type 2 diabetes in kids. Retrieved from http://www.cdc.gov/diabetes/prevent-type-2/type-2-kids.html

Centers for Disease Prevention and Control. (2018). National Diabetes Prevention Programs: Registry of all recognized organizations. Retrieved from http://www.need.cdc.gov/DPPT_DPRP/resitru.aspx

Curtis, K., Fry, M., Shaban, R., & Considine, J. (2017). Translating research findings into clinical nursing practice. *Journal of Clinical Nursing, 26*(5-6), 862-872. doi:10.1111.jocn.13586

Dearing, J. (2010). Applying diffusion of innovation theory to intervention development. *Researching Social Work Practices, 19*(5), 503-518. doi:10.1177/1049731509335569

Dyson, T. (2019, September 10). Many primary care doctors underscreen or misdiagnose diabetes. *United Press International.* Retrieved from upi.com

Glanz, K., Rimer, B., & Lewis, F. (2002). *Health behavior and health education: Theory,research, and practice* (3rd ed.). San Francisco, CA: Jossey-Bass.

Hagstrom, M. (2016). Can we beat diabetes? Prevention and management strategies.

Nurse Zone. Retrieved from http://www.americanmobile.com/mobile/NZArticle/?articleid=2284

Harvard, T.H. Chan. School of Public Health (n.d.). Simple steps for preventing disease. Retrieved from www.hsph.harvard.edu/nutritionsource/disease-prevention/preventing-diabetes-full-story/

Healthy People2020. (2014). *Diabetes: Midcourse review.* Retrieved from http:www.http://www.healthpeople.gov/2020/topics-objectives/topic/diabetes

Holliday, C. S., Williams, J., Salcedo, V., Kandula, N. R. (2019). Clinical identification and referral of adults with prediabetes and diabetes to a diabetes prevention program. *Prevent Chronic Disease, 16,* 180540. doi:10.5888/pcd16.180540

Johnson, L. N., Melton, S. T. (2016). Perceived benefits and barriers to the diabetes prevention program. *People Living With and Inspired by Diabetes, 2,* 16-24. http://dx.doi.org/10.17125/plaid.2016.65

Kandula, N., Moran, M., Tang, J., & O'Brien, M. (2018). Preventing diabetes in primary care: Provider's perspectives about diagnosing and treating prediabetes. *American Diabetes Association, 41*(7), 1462-1470. http:/doi.org/10.2337/dc17-2685

Keck, J., Roper, K., Thomas, A., & Hieronymus, L. (2019). 346-OR: Primary care implementation study to increase diabetes prevention program referrals. *American Diabetes Association, Diabetes Journals, 16*(1). http://doi.org/10.2337/db19-346-

Keck, J. (2019, September 18). No patient with prediabetes referred to prevention programs. *Journal of American Board of Family Medicine.* doi:10.3122/jabfm.2019.190114.

Khan, T., Tsipas, S., & Wozniak, G. (2017). Medical care expenditures for individuals with prediabetes: The potential cost savings in reducing the risk of developing diabetes. *Population Health Management, 20*(5), 389-396. doi:10.1089/pop.2016.0134

Konchak, J., Moran, M., O'Brien, M., Kandula, N., Ackermann, R. (2016, June). The state of Diabetes prevention policy in the U,S. following the Affordable Care Act. *Current Diabetes Report, 16(6); 55.* Doi: 10.1007/s11892-016-0742-6.

Minerd, J. (2019, May 10). Few high-risk patients attend diabetes prevention programs-Likely reason providers often failed to recommend them. *MedPage Today.* Retrieved from https://www.medpagetoday.com/endocrinology/diabetes/79751

Palmer, S. (2009). Diabetes prevention: the best medicine. *Aging Well, 2*(2), p. 22. Retrieved from http://www.todaygeriatricmedicine.com/archive/030209p.22.Html

Peimani, M., Tabatabaei-Malzay, O., Pajouhi, M. (2010). Nurse role in diabetes care: A review. *Iranian Journal of Diabetes and Lipid Disorders,* 9(4), 1-9. *Retrieved* from http://www.researchgate.net/publication/236985435.Nurse'-role-in-diabete-care-a-review

Powers, M., Bardsley, J., Cypress, M., Duker, P., Funnell, M., Fischi, A., Maryniuk, M., Diabetes self-management education and support in Type 2 diabetes: A joint position statement of the American Diabetes Association, the American

Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *American Diabetes Associations: Clinical Diabetes, 34*(2), 70-80. doi:10.2337/diaclin.34.2.70

Ray, M., Thielke, A., & King, V. (2017). Diabetes prevention programs. *Centers for Evidence-Based Policy: Oregon Health & Science University.* Retrieved from Walden University Database.

Rowland, T. (2012, October 30). Basic tenets of nursing ethics. *Soliant Healthcare.* Retrieved from soliant.com/healthcare-news/basic-tenets-of-nursing-ethics/.

Shurbrook, J., Chen, W., Lim, A. (2018, November). Evidence for the prevention of type 2 diabetes mellitus. *Journal of American Osteopathic Association. 118(11); 730-737.* Doi: https//doi.org/10.7556/jaoa.2018.158

Sunaert, P., Vanderckhove, M., Bastiaens, H., Feyen, L., Bussche, P., DeMaeseneer, J., . . . Williams, S. (2011, September 8). Why do GPs hesitate to refer diabetic patients to self-management education programs: A qualitative study. *BMC Family Practice: 12(94).* Doi: 10.1186/1471-2296-12-94

Troupe, J. (2017, May). The value of a return on investment in promoting prevention. One center's journey and perspective. *AADE in Practice; 5(3).* Retrieved from http://www.doi.org/10.1177/2325/6031770134

United Health Rankings. (2018). America's health rankings: Nevada annual report. Retrieved from http://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/NV

United Health Foundation. (2019). Diabetes in Nevada. *America's Health Rankings.* Retrieved From http://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/NV

Weiss, M., & Mwalili, A. (2018). The burden of diabetes in Nevada: 2017 Preliminary report. Retrieved from http://www.dpbh.nv.gov/uploadedFiles/dphnv.gov.content/Programs/Diabetes/dta/Publications/Burden%20of%Diabetes%20in%20Nevada%202017%20Final%203.6.17pdf

Whittemore, R., Melkus, G., Wagner, J., Dziura, J., (2009, January-February). Translating the Diabetes Prevention Program to primary care: A pilot study. *Nurse Res. 58(1), 2-12.* Doi: 10.1097NNR.0b013e31818fcef3.

Williams, J., & Cullen, L. (2016). Evidence into practice: Disseminating an evidence-based practice project as a poster. *Journal of Peri-Anesthesia Nursing. 31(5). 440-444.* Retrieved from http://doi.org/10.1016/j.jopan.2016.07.002

Appendix A: Program Outline

Title: Development of a Staff Educational Model to Decrease the Incidence of Type 2 Diabetes

Description: This prevent type 2 diabetes staff educational model is based on recent evidence in prediabetes care from the Centers for Disease Control and Prevention (CDC) Prevent Type 2 Diabetes Curriculum in partnership with the National Institutes of Health. The program is designed to prevent or delay the incidence of type 2 diabetes in adults through increasing awareness of the benefits and need of DPPs.

Program Mission: To increase awareness in clinicians of the benefits of CDC Prevent T2 diabetes prevention programs to help increase referrals to these programs or encourage the development of more diabetes prevention programs.

Program Goal: To increase awareness and access to diabetes prevention programs with the ultimate goal of decreasing the incidence of type 2 diabetes in adults.

Target Audience: The target audience is primary care clinicians.

Instructional Method: Prediabetes staff educational model PowerPoint of which clinicians complete at a self-pace, with a maximum completion time of four weeks.

Learning Objectives: Upon successful completion of the staff educational model clinician's will:

1. Have increased knowledge and awareness of prediabetes, its diagnosis, and management.
2. Describe preventive methods to prevent type 2 diabetes.
3. Have increased knowledge of resources available for management of prediabetes, thus decreasing rate of type 2 diabetes diagnoses.

4. Describe benefits of diabetes prevention programs; In particular CDC Prevent T2 diabetes programs.
5. Describe how Prevent T2 programs work, run, and accessed.

Outcome Evaluation: Thirty-day postquestionnaire.

Outcome Evaluation Goal: Increased awareness of benefits of CDC Prevent T2 diabetes prevention programs and increased referrals to these programs, or development of more such programs.

Appendix B: Prediabetes Staff Educational Model

PREVENT TYPE 2 DIABETES: A STAFF EDUCATIONAL MODEL

Learning Objectives:

- Increase healthcare clinicians' knowledge and awareness of prediabetes, its diagnosis, and management.
- Discuss type 2 diabetes prevention.
- Increase awareness of resources available for management of prediabetes, thus decreasing rate of type 2 diabetes diagnosis.
- Discuss benefits of diabetes prevention programs; In particular CDC Prevent T2 diabetes prevention programs.
- Discuss how Prevent T2 programs work and are run.

Diabetes in the US:

- The US. spent over $325 billion dollars in 2017 on diabetes care, a 26% increase since 2012.
- Diabetes care is responsible for over $85 billion dollars in reduced productivity in the U.S.
- It is projected that the number of people diagnosed with diabetes will go from 1 in 10 to 1 in 3.
- 90-95% of persons diagnosed with diabetes have type 2 diabetes (ADA, 2019).

With the rising cost of care and increased # of persons diagnosed with type 2 diabetes, the U.S. healthcare system will not be able to afford the cost of management of the disease, unless rates of diagnosis are decreased.


HEALTHCARE
SPENDING IN THE U.S.
IMPROVING OUR HEALTHCARE SYSTEM
IS CRITICALLY IMPORTANT TO OUR NATION'S
LONG-TERM ECONOMIC AND FISCAL WELL-BEING.

Prediabetes:

- Occurs when blood glucose levels are above normal, but not high enough to be considered diabetes.
- Is a sign of increasing insulin resistance.
- Precursor for development of type 2 diabetes if not managed.
- Increases risk for cardiovascular disease and stroke
- Those with hypertension, low levels of HDL and hypertriglyceridemia are at increased risk for developing prediabetes.

Prediabetes:

- Affects over 85 million persons in the U.S. (>30% of the population)
- 90% of Americans do not know they have the disease
- Affects nearly half of adults 65 years or older
- Affects approximately 13% of adults age 45-64
- Care increased from $33 billion to $44 billion between 2007-2012
- Risk of developing type 2 diabetes is 5-10% annually and 70% over lifetime (ADA, 2019).

Prediabetes: Who's Most at Risk?

- Adults and adolescents who are overweight; BMI >25 and one or more of the following:
- Age 45 or older
- Family history of type 2 diabetes: parent or sibling
- Those with sedentary lifestyle: are inactive less than three times week
- Women who had gestational diabetes or gave birth to a baby weighing >9lbs.
- Persons from the following ethnic groups: African American, Hispanic/Latino, American Indian, Pacific Islander, Asian Americans
- Women diagnosed with polycystic ovarian syndrome (PCOS).
- Persons with certain sleep disorders (example: obstructive sleep apnea, or shift workers suffering from insomnia).

Who should be screened:

The American Academy of Clinical Endocrinologists (AACE) and the American Diabetes Association (ADA) recommends screening for those who:
(Pippit, Li, & Girgle, 2016)

- Present with acanthosis nigricans
- Age ≥ 45
- First degree relative with type 2 DM
- On antipsychotic therapy or have bipolar disorder
- Chronic glucocorticoid therapy
- Have cardiovascular disease
- HDL < 35, Triglycerides > 250
- Hypertension: BP > 140/90 or on antihypertensive medication
- impaired glucose tolerance, impaired fasting glucose, and/or metabolic syndrome

- Have impaired glucose tolerance, impaired fasting glucose, or metabolic syndrome
- Members of at-risk ethnic groups: African American, Latino/Hispanic, Asian American, Native American, Pacific Islander
- Overweight or obese
- PCOS diagnosis
- Sedentary lifestyle
- Sleep disorders

  *****Screening for those with two or more risk factors should be annually**

Prediabetes: Criteria for Diagnosis

- Impaired fasting plasma glucose: fasting plasma glucose = 100 to 125 mg per dL
- **or**
- Impaired glucose tolerance: two-hour plasma glucose in the 75-g OGTT = 140 to 199 mg per dL
- **or**
- A1C 5.7% to 6.4%
- **(Pippit, Li, & Girgle, 2016)**

Prevent Type 2 Diabetes Programs: (Prevent T2)

- **Are Centers for Disease Control and Prevention recognized programs**
- Are reimbursable Medicare services, and are covered by many other health insurance carriers.
- Utilize certified lifestyle coaches who teach and support participants in lifestyle changes to decrease risk of developing type 2 diabetes
- Programs last 1 year: participants meet for at least 16 weeks, 1 hour sessions (either weekly, biweekly, monthly)
- **Lowers a person's risk of developing type 2 diabetes by 58%, 71% in those 65 or older**
- **Have proven to be one of the most cost-effective ways to reduce the**

incidence of type 2 diabetes (Khan, Tsipas, & Wozniak, 2017).

Prevent T2 Lifestyle Coaches

- Are certified by the CDC after attending a two day interactive course and passing a post exam.
- Who qualifies for lifestyle coach certification? Healthcare professionals, community health workers, peer educators.
- Lifestyle coach courses and DPPs can be held in healthcare settings, workplaces, and community-based organizations.

Prevent T2 Programs

- Teach and support weight loss, healthy eating, physical activity, coping skills, and stress management.
- Only persons with a diagnosis of prediabetes: A1c 5-7 to 6.4% qualify, not those with type 2 diabetes.
- Research has shown that Prevent T2 Programs:
  - Lower the risk of developing type 2 diabetes by more than 50%
  - Delay onset of type 2 diabetes by at least 10 years
  - Reduce cardiovascular disease risk factors
  - Help reduce health care costs by over $500 billion (Khan, Tsipas, & Wozniak, 2017).

Nevada Statistics:

- Over 35% of Nevadans have prediabetes
- An estimated 1 in 4 persons don't know they have prediabetes
- 12,000 new diagnosis of diabetes occur annually in Nevada
- Nevada spends more than $2.5 billion dollars annually on direct and indirect diabetes care
- Diabetes care is 2.3 times higher in the state than non-diabetes care
- > 25% of state is obese and > 25% report being physically inactive (Jones, Thompson, et.al., 2019).
- **Only 9 programs exist in Nevada; 1 program in the Las Vegas area!!!**

- Lifestyle interventions (done under the guidance of Prevent T2 programs) prevented or delayed the diagnosis of type 2 diabetes in one in every seven participants.
- Lifestyle interventions are key to diabetes prevention.
- Only about 10% of patients diagnosed with prediabetes are treated and less are referred to diabetes prevention programs.

Wrap It Up:

- **Of the 85 million Americans who have prediabetes, it is estimated that >70% will develop type 2 diabetes without intervention.**
- **The Diabetes Prevention Trial**, one of largest diabetes clinical trials has established that: **lifestyle interventions** that promote healthy lifestyle interventions which include **healthy eating, weight loss, and regular physical activity** can **reduce** the incidence of **type 2 diabetes by 58%, by 71%** in those age 65 and older and **reduces** the incidence of **diagnosis of type 2 diabetes by 15+ years**, reduces microvascular and macrovascular disease, cardiovascular mortality, and all-cause mortality (American Academy of Family Physicians, 2019).

- **Let's decrease the incidence of type 2 diabetes, help improve patient outcomes and quality of life in our country by referring persons with prediabetes to CDC-recognized Prevent T2 diabetes programs.**
- **CDC Prevent T2 Diabetes programs are reimbursable services through Medicare and many other health insurance providers.**

Nurses can initiate, facilitate, and receive reimbursement for DPPs.

Prediabetes Patient Education Brochure

Lifestyle changes, such as:

- **Weight loss (5-7%)**
- **Healthy eating**
- **150 min of physical activity each week**

Lowers a person's risk of developing type 2 diabetes by 58%, 71% for those 65 and older. Those most at risk for developing prediabetes includes those who are:

*** Overweight**

- ***Are 45 or older**
- ***Have a parent or sibling with type 2 diabetes**
- ***Are sedentary, active less than 3 times a week**
- ***Had gestational diabetes or gave birth to a baby who weighed more than 9lbs**

***Prediabetes affects 1 in 3 persons**
***9 out of 10 persons don't know they have prediabetes.**
*****If you are African American, Hispanic/ Latino American, American Indian, Pacific Islander, or Asian American you're at higher risk for developing prediabetes.**

Prevent type 2 (Prevent T2) is an evidence-based diabetes prevention program (DPP), approved by the Centers for Disease Control and Prevention. There are over 700 diabetes prevention programs in America, 13 in Nevada, 2 in Las Vegas.
Diabetes Prevention Programs:

- **Utilize certified lifestyle coaches who teach and support participants in lifestyle changes to decrease risk of developing type 2 diabetes.**
- **Programs last 1 year**
- **Programs support weight loss, healthy eating, physical activity, coping skills, managing stress.**

- **CDC Prevent T2 programs are reimbursable Medicare services.**

How's it done?

Ask your health care provider about a referral to a Prevent T2 program.

Prevent T2 programs encourage and support those at risk to:

1. **lose weight (5-7% of body weight) for those who are overweight**
2. **eat nutrient dense foods (more fruits, veggies, and whole grains)**
3. **cut daily caloric intake by 500 calories**
4. **cut out simple carbs**
5. **encourage at least 150 min of physical activity week**
6. **encourage and teach coping skills and use of support systems**
7. **Find out more about Prevent T2 programs at: www.cdc.gov/prevent/diabetes**

Appendix C: Post-Questionnaire

1. Prediabetes is a serious condition that often goes untreated?

   Strongly agree Agree Disagree Strongly disagree

2. Prediabetes can be reversed with early diagnosis and treatment?

   Strongly agree Agree Disagree Strongly disagree

3. Without treatment 15-30% of persons diagnosed with prediabetes will develop type 2 diabetes?

   Strongly agree Agree Disagree Strongly disagree

4. Increasing knowledge of diabetes prevention programs will help improve referrals to diabetes prevention programs?

   Strongly agree Agree Disagree Strongly disagree

5. Lifestyle changes taught in diabetes prevention programs will help improve patient outcomes?

   Strongly agree Agree Disagree Strongly disagree

6. The educational model helped to improve my knowledge of the benefits of diabetes prevention programs?

   Strongly agree Agree Disagree Strongly disagree

7 There is a need for increased referrals to diabetes prevention programs in the primary care setting?

   Strongly agree Agree Disagree Strongly disagree

8 There is a need for more diabetes prevention programs in the Las Vegas area?

   Strongly agree Agree Disagree Strongly disagree

9 Prevent type 2 diabetes programs (PT2) are Centers for Disease Control and Prevention approved programs, which health care providers can develop, operate, and be reimbursed for?

Strongly agree Agree Disagree Strongly disagree

10 Nurses, physicians, and advanced practice providers can develop and facilitate diabetes prevention programs?

Strongly agree Agree Disagree Strongly disagree

Comments:

_____

_____

_____

_____

_____

_____